BI-DIRECTIONAL FOUR-MODE CLUTCH FOR PROVIDING LOW AND REVERSE GEAR RATIOS IN A TRANSMISSION

ABSTRACT OF THE DISCLOSURE

A bi-directional overrunning clutch assembly employed in connection with a reduced capacity low friction clutch to provide low and reverse gears in a transmission. The clutch assembly including an inner race, an outer race, and engagement members supported therebetween. The inner race is operatively coupled to the transmission casing and the outer race is operatively coupled to the ring gear of the gear set as well as the inner race of the friction clutch assembly. The clutch assembly further includes at least one actuating cam. The actuating cam operates to actuate the engagement members to provide four separate modes of operation between the inner and outer races of the clutch assembly. More specifically, the cam is operable to (1) disengage the engagement members to provide freewheeling between the inner and outer races in both rotational directions; (2) to actuate engagement members so that torque is translated in one rotational direction but to allow freewheeling in the opposite rotational direction; (3) to actuate the engagement members so that torque is translated in a direction opposite to that in mode (2) above, but allow freewheeling in the rotational direction opposite to that in which torque is translated in this mode; and (4) to actuate the engagement members so that the inner and outer races are locked relative to each other and torque is translated in both rotational directions.